AutoSPRAY 4080
User Manual

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AutoSPRAY 4080 User Manual

Written for AutoSPRAY 4080 software Version 2.1

Publication Date: January 2007

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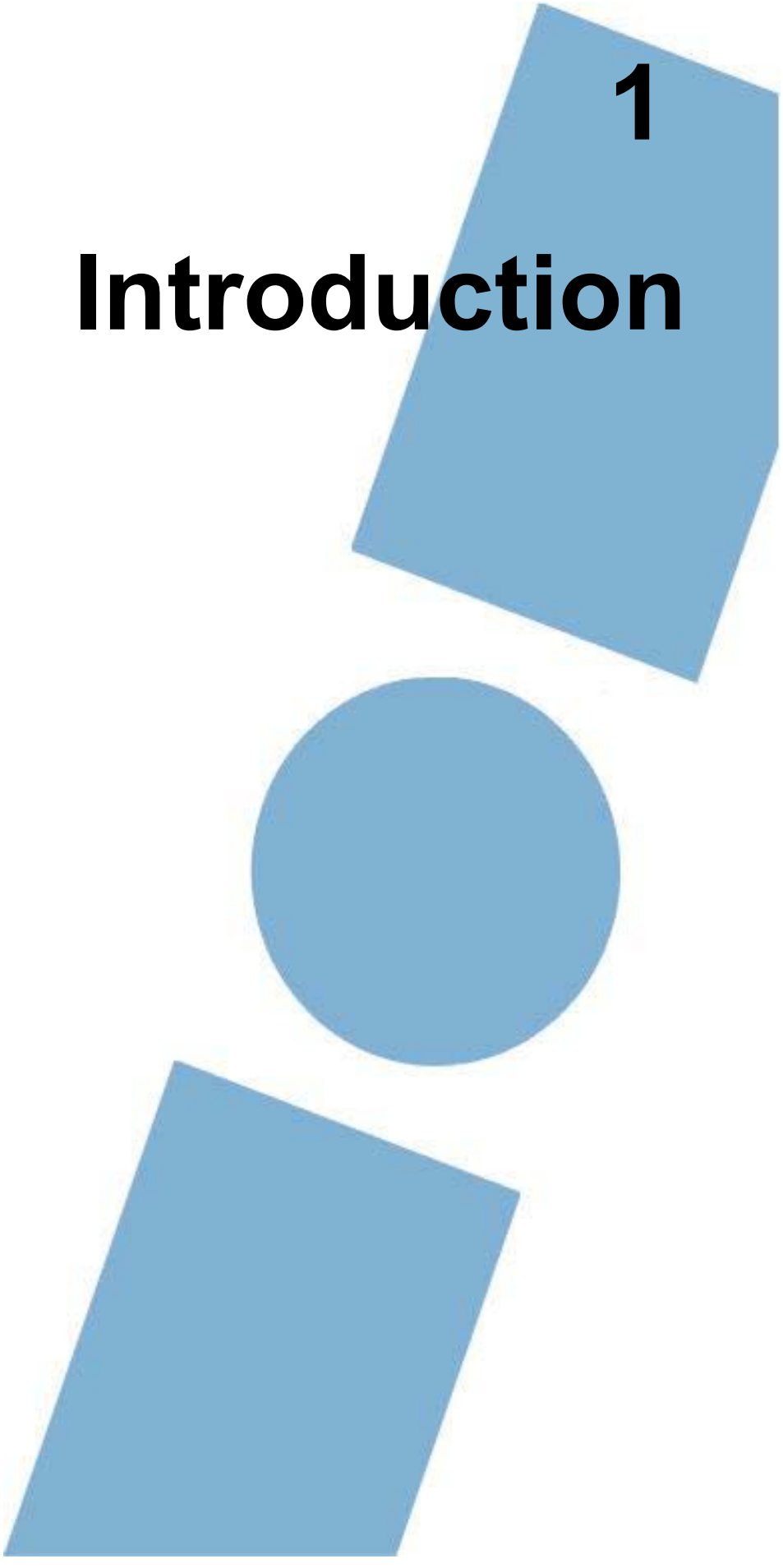
1

Introduction



Welcome to the AutoSPRAY 4080 User Manual. This document describes how to use the AutoSPRAY 4080 system.

The AutoSPRAY 4080 system is designed to connect to your existing Spray Controller and GPS guidance system to provide automatic boom section control. This will greatly reduce the need for manually switching sections ON or OFF when going over previously sprayed crop or pasture. Its ability to automatically control the spraying state of the sections relieves the operator from an arduous task which requires split second timing on multiple switches. Unlike other AutoSPRAY models which were incorporated with the guidance system the AutoSPRAY 4080 is an autonomous system which can be interfaced with most existing spray rate controllers and GPS receivers.

This manual is designed to assist users of the AutoSPRAY 4080 in the operational use of the AutoSPRAY 4080 hardware and software.

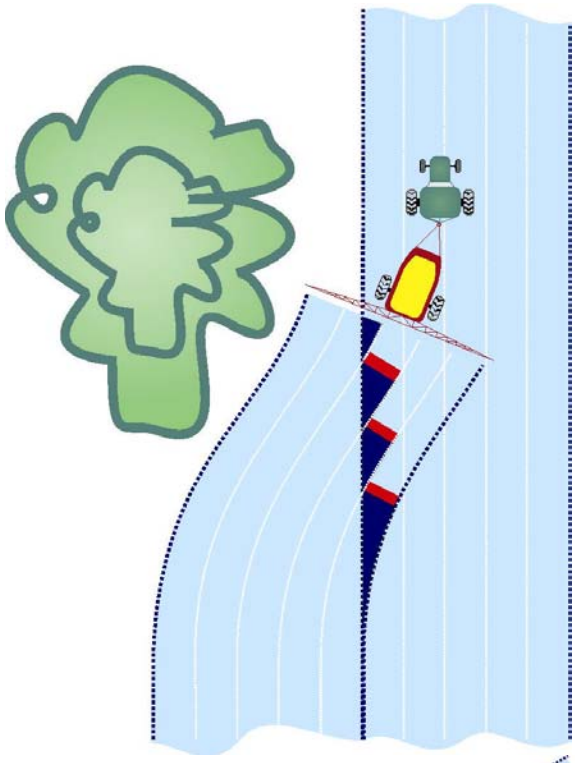
1.1 AutoSPRAY 4080 Standard Features

Timing Delays	The AutoSPRAY 4080 can be adjusted for delays from electrical to mechanical switching.
Variable Overlap	Allows the operator to configure the required overlap.
Vehicle Modeling	Allows the operator to accurately define vehicle and boom dimensions.
Antenna Offsets	Allows the operator to define the GPS antenna offsets.
Standby Mode	Allows the operator to disable AutoSPRAY to allow the spray controller to be operated manually.
Inclusion & Exclusion zones	Allows the operator to set boundaries for the spraying operation.
Manual Override	Allows the operator to manually select boom sections to be ON or OFF, overriding AutoSPRAY.

1.2 Typical Uses of the AutoSPRAY 4080

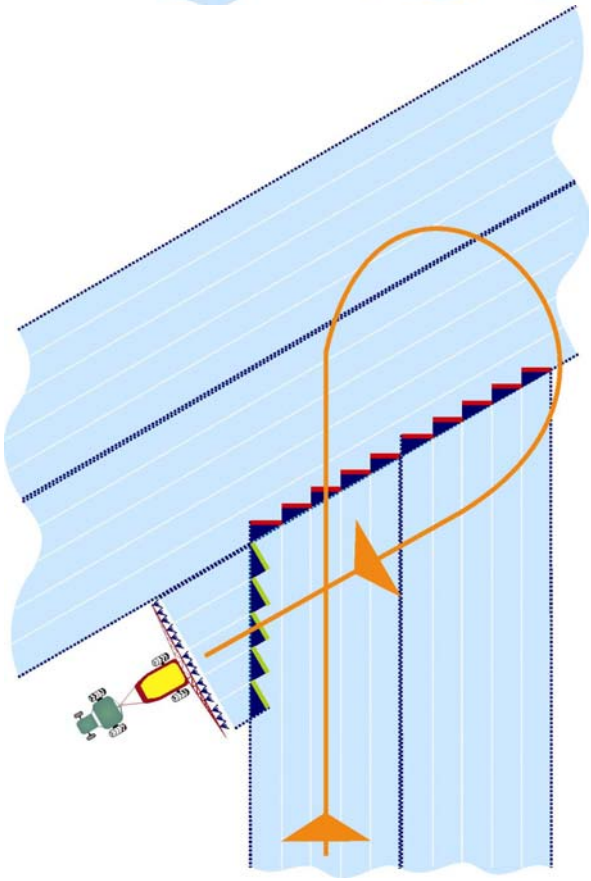
Spraying around obstacles

Automatically minimise over spray around trees or rock heaps. AS4080 detects areas previously sprayed and shuts down sections and reactivates as necessary.



Spraying headlands

AS4080 detects areas previously sprayed as the headlands are approached and shuts down sections and reactivates as necessary.



1.3 AutoSPRAY 4080 Components

When you receive your AutoSPRAY 4080 system, please check that you have received all of the components detailed on the packing list. See below for a list of components supplied.

Quantity	Description	Part Nō.
1	AutoSPRAY 4080 Controller	1-0480
1	Mounting kit	1-0212
1	Power cable	☞
1	AutoSPRAY 4080 User Manual	1-1250
1	AutoSPRAY 4080 Quick Start Card	1-1315
1	GPS interface cable	☞
1	Generic spray rate controller cable	☞

Inspect all items for visual damage. If any component appears to be damaged, contact your supplier immediately. Ensure all packaging and shipping details are kept for future reference.

It is important the spray rate controller adaptor cable ordered matches your spray rate controller. Using the wrong cable may damage your spray rate controller or the AutoSPRAY 4080 controller.

☞ *Variants of these cables are available. Refer to Appendix B for a list of cables customised to your particular installation.*

2

Installation

This section describes how to connect and install the components of the AutoSPRAY 4080 system.

A schematic of the AutoSPRAY 4080 and how it connects to the spray rate controller and GPS receiver is shown in Figure 2.1

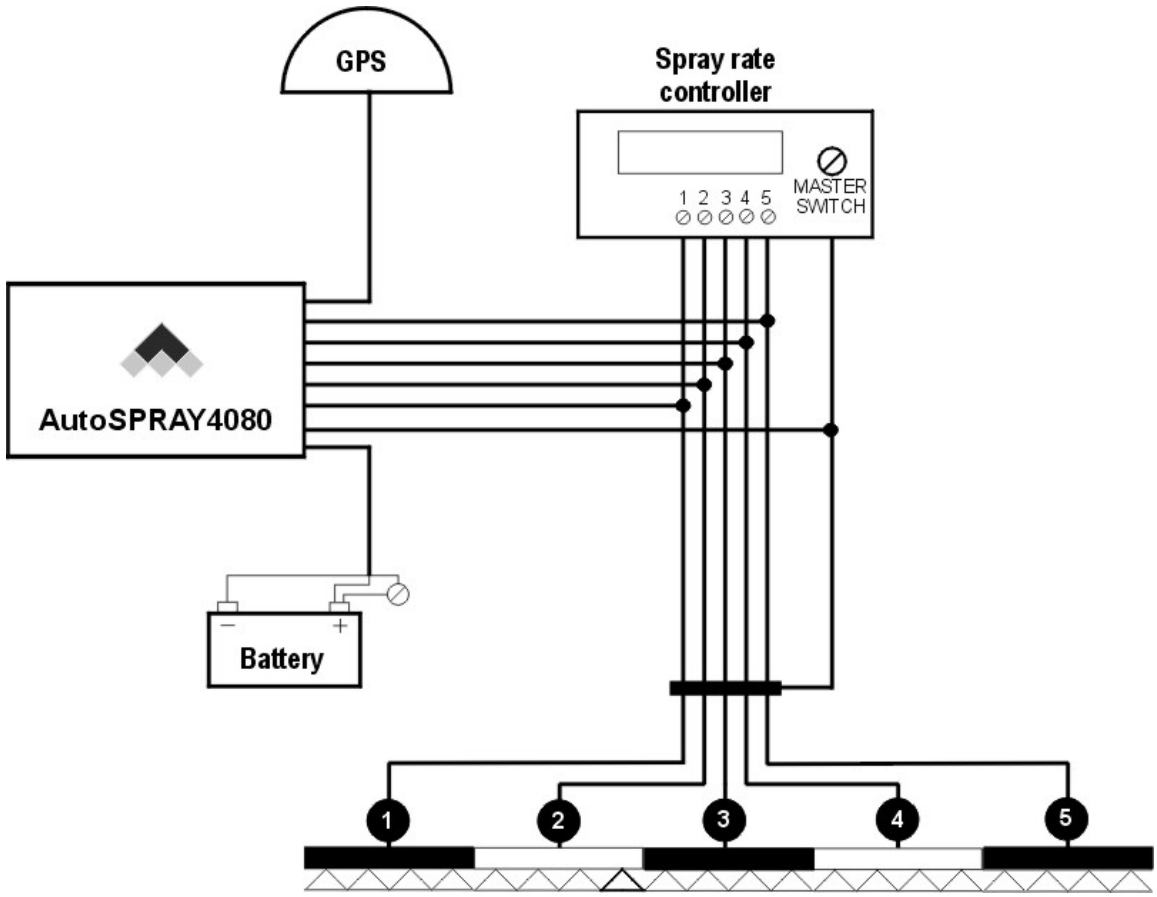


Figure 2.1 Schematic layout of the AutoSPRAY 4080

It is recommended that all electrical wiring should be installed by a qualified auto-electrician. Incorrect wiring may damage the AutoSPRAY 4080 controller, the spray rate controller, or both.

2.1 Installing the AutoSPRAY 4080

Prior to installing the AutoSPRAY 4080 system, it is recommended that the operator reviews Chapter 3 to familiarise themselves with the individual components of the system.

Step	Instruction
1	Attach the mounting plate, P/n 1-0213 to the underside of the AutoSPRAY 4080 controller with the supplied screws..
2	Install the AutoSPRAY 4080 Controller in a suitable location in the vehicle to allow the operator to have access to the keypad. The location should not impede upon the vision of the operator or restrict access to any vehicle controls. Four screws are provided to mount the controller to the vehicle. Ensure that the Isolation Power Switch (IPS) on the AutoSPRAY 4080 controller is in the OFF (O) position.
3	Route the DC power cable from the vehicle's battery to the AutoSPRAY 4080 controller. Connect the DC power cable to the battery and ignition line. Further details on connecting the power cable is described in Section 2.2.
4	Route the supplied spray rate controller cable from the spray rate controller to the AutoSPRAY 4080 controller. Connect the cable to the spray rate controller. Further details on connecting the spray rate controller cable are contained in Section 2.3.
5	Route the GPS Interface cable from the GPS guidance system to the AutoSPRAY 4080 controller. Connect the cable to the GPS receiver. Further details on connecting the GPS Interface cable are contained in Section 2.4.
6	Ensure that the vehicle ignition is OFF. Use the Isolation Power Switch (IPS) to power on the AutoSPRAY 4080 controller to check that the power cable has been correctly installed. Note! – The unit will not power up completely at this time. Power Status LED on the keypad should display in RED
7	Power Off the controller using the IPS.

2.2 Connecting Vehicle Power

The RINEX power cable (P/N 1-2406) is a three core power cable which allows the AutoSPRAY 4080 controller to be connected directly to the vehicle's battery. The cable can be connected directly to a 12vDC battery supply without the need for any additional step-down converters.

RED	Positive wire with in-line fuse connects to the vehicle battery positive terminal (12 vDC ONLY), fitted with a M12 ring connector.
BLACK	Ground wire connects to the vehicle battery negative terminal, fitted with a M12 ring connector.
ORANGE	Positive wire connects to the vehicle ignition ON circuit. The wire is connected into the vehicle's ignition circuit such that the AutoSPRAY 4080 will detect when the ignition is switched on and off.

☞ *The RINEX power cable is assembled within split tubing to allow the orange wire to be separated at any point to allow for in-cab termination.*

The cable should be routed from the operator's cab to the vehicle's batteries through a dedicated cable gland. If necessary an exit hole will have to be drilled into the vehicle which should be fitted with a rubber grommet to protect the cable from rubbing directly on the vehicle wall. The hole should be sealed with the supplied silicone sealant to prevent dust and moisture from entering the cab.

Customized Power Connector Cables

It is possible to order customized power connection cables to simplify the installation of the AutoSPRAY 4080. Cables are available for the John Deere power strip connection and the universal thee pin circular connector. Both connectors provide direct battery power and the ignition circuit power. Refer to Appendix B for optional cable information.

DC Power Cautionary Notes

⚠ The RINEX power cable supplied should only be connected

directly to the battery with the supplied fuse in place. We strongly recommend NOT removing the supplied fuse. If a power wire should short to the vehicle body, a battery can supply a current that will heat the wire to the point where the insulation will catch fire. A fuse mounted inline near the battery connection point and before the cable passes through the vehicle panel will prevent the risk of a vehicle fire.

The RINEX power cable should not be connected to the input or output terminals of a step-down converter in a 24v DC system as typically the converter will effect system performance.

The RINEX power cable should not be connected directly to the battery if the vehicle is equipped with a battery isolator switch. In these cases the negative wire (black) should be connected to the vehicle side of the isolator.

2.3 Connecting the Spray Rate Controller

A generic spray rate controller cable is supplied with the AutoSPRAY unless a specific cable was ordered at the time of purchase. Pre-assembled cables which plug directly from the AutoSPRAY 4080 controller to spray rate controllers such as a Raven 440/450, Farmscan 24V1, or a TeeJet 844 can be ordered with the system.

See Appendix B – AutoSPRAY 4080 Options for available spray rate controller cables. Each cable kit is supplied with comprehensive installation instructions.

When the spray rate controller cable has been installed, connect the 16 pin AMP circular connector the AutoSPRAY 4080 back panel.

To test Spray Rate Controller cable, follow the steps below.

Step	Instruction
1	Ensure that the Isolation Power Switch (IPS) is in the ON position. Turn the vehicle ignition on to start the AS4080 system.
2	The DISPLAY menu will be shown. This displays the status of the Master Control switch, and the state of the configured sections.
3	Switch the selected Master Control switch to ON.
4	The display should change to **M=on**. The change should be shown on the Spray Controller display.
5	Switch the selected Master Control switch to OFF.
6	The display should change to **M=off**. The change should be shown on the Spray Controller display.

A delay may occur between the switching of the Master Control switch and when the **M=** value is changed on the AutoSPRAY 4080. This delay is due to the type of electrical circuit switching used within the Spray Rate Controller.

If **Status M=** value does not change, check that the cable has been installed correctly.

2.4 Connecting the GPS

A GPS receiver or guidance system with an incorporated GPS needs to be connected to the AutoSPRAY 4080 using a serial interface.

An interface cable is supplied with the AutoSPRAY 4080 kit, which will suit most GPS receivers. However it is possible that a different cable will be required to connect the GPS receiver to the AutoSPRAY 4080. See Appendix B for common GPS receiver interface cables.

The GPS output messages required are NMEA GGA and VTG at 5Hz. The default baud rate is 19,200 but can be changed if required.

You will need to refer to your GPS system User Manual to assist in determining data port settings.

To test the GPS interface, follow the steps below.

Step	Instruction
1	With the Isolation Power Switch (IPS) ON, turn the vehicle ignition ON.
2	Use ⊛ to show the DISPLAY menu, then ⊛ to move to the GPS Status option.
3	The **Sats=** displays the number of satellites currently being observed. If the number is equal to 0 (zero), then GPS may be incorrectly configured.

GPS Accuracy – An Important Issue

The relative accuracy of your GPS system will determine the overall performance of the AutoSPRAY 4080 system. The more accurate the GPS, the more accurate AutoSPRAY will be.

By default the AutoSPRAY 4080 is configured to function only with a differentially corrected GPS position (DGPS). Typically DGPS is quoted with sub-metre accuracy, hence the AutoSPRAY will be of an equivalent accuracy.

The AutoSPRAY 4080 can be configured to function with non-corrected GPS positioning, or sometimes referred to as stand-alone GPS. The resultant accuracy of the AutoSPRAY 4080 will once again be directly related to the GPS signal.

RINEX recommend that the AutoSPRAY 4080 always be used with a DGPS to provide optimal accuracy with the overall system, it is the operator's responsibility to determine the accuracy of the GPS.

☞ *Check with your supplier of the GPS receiver or guidance system to determine to overall accuracy you should expect*.

☞ *See also Section 3.4 for further information.*

3

Getting Started

This section details the steps taken for the first time user of the overall system. In particular this section describes the correct way in which to power the system ON and OFF.

In addition, this section describes the front and rear panels of the AS4080 Spray Controller, and contains instructions on configuring the AS4080 for the correct GPS and spray controller settings.

Furthermore this section describes the necessary information, which includes measurements on the vehicle to ensure that the system will function correctly.

3.1 Powering the System

Prior to this step the AutoSPRAY 4080 system should be completely installed into the vehicle in accordance with the installation instructions (See Section 2 of this manual).

1. Turn the Isolation Power Switch (IPS) on the AutoSPRAY 4080 controller box to the ON position (-). This will not immediately power the system as the vehicle ignition must also be ON. See Figure 3-1 to locate the IPS.

2. With the IPS on the AutoSPRAY 4080 controller in the ON position, start the vehicle and leave the engine running. The AutoSPRAY 4080 will start to power on after approximately one minute.

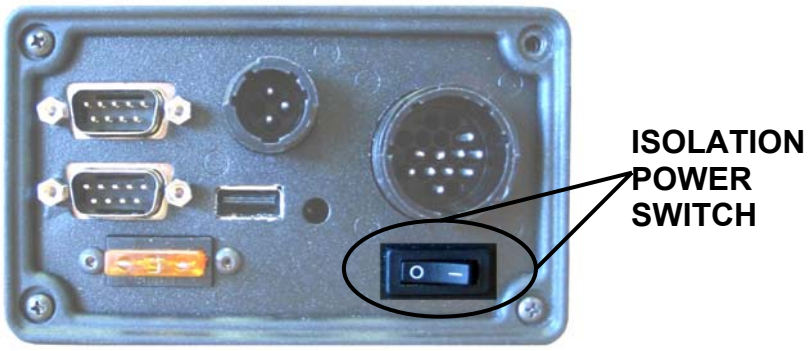


Figure 3-1 : AutoSPRAY 4080 Controller & IPS

3. To shut the AutoSPRAY 4080 Controller OFF, simply turn the vehicle ignition off. This will shutdown the AutoSPRAY 4080 Controller and power down the system. The IPS should not be switched to the OFF position.

In normal operation, leave the Isolation Power Switch (IPS) on the AutoSPRAY 4080 controller in the ON position (-) at all times. Use the vehicle ignition switch to turn the AutoSPRAY 4080 ON and OFF, the IPS should only be turned OFF if the AutoSPRAY 4080 is not required to be operational for an extended period.

3.2 The Front Panel

The front panel of the AutoSPRAY 4080 consists of an LCD screen and a keypad to operate the system. The components of the front panel are described below.

Figure 3-2 : The AutoSPRAY 4080 Front Panel

Component	Description
LCD Screen	A two line LCD screen, used to display program menus.
GPS Status	GPS Status LED Green – Good DGPS Orange – Poor DGPS Red – No DGPS Off – No Data See page 23 for more details on GPS Status.
Power Status	Power LED Green – AutoSPRAY operational Orange – Standby Mode Red – Power connected but unit is off. Off – No power connected
Standby Button	Press to enter Standby Mode or alternatively used as a master switch when the Control setting is set to keypad.
Up Button	Press to move between menus or to change setting values.
Down Button	Press to move between menus or to change setting values.
Left Button	Press to move left in a menu.
Right Button	Press to move right in a menu.
Enter Button	Press to select a menu item for editing. Press to save setting after editing.

3.3 The Back Panel

The back panel of the AutoSPRAY 4080 is used to connect to the spray controller and to the external GPS source among other peripherals. The components of the back panel are described below.

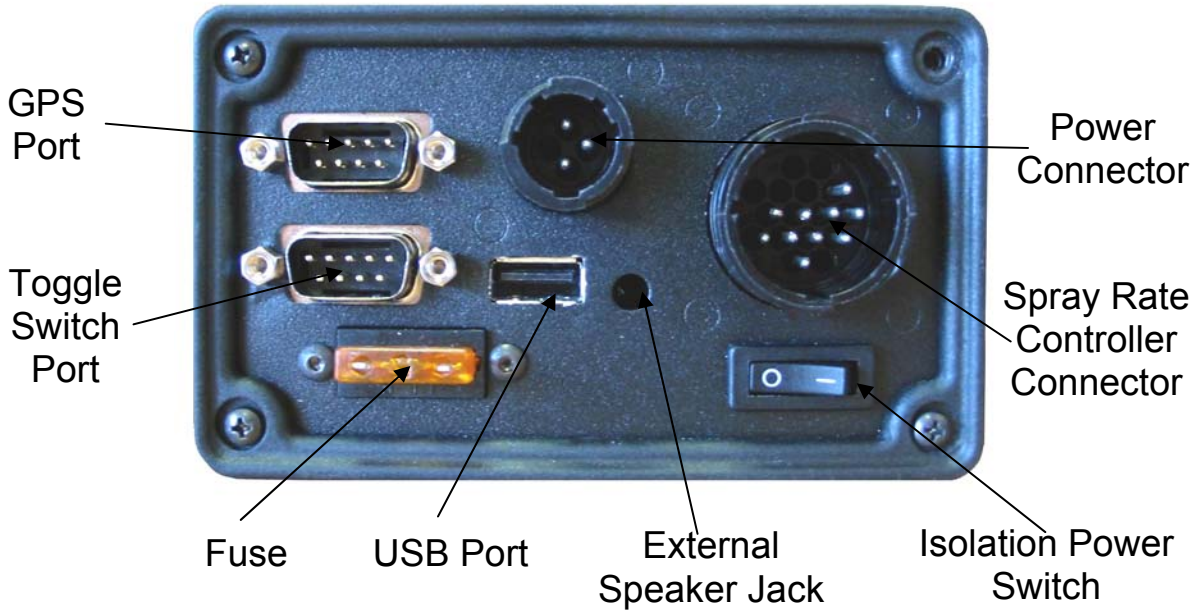


Figure 3-3 : The AutoSPRAY 4080 Back Panel

Component	Description
GPS Port	Used to connect external GPS input.
Toggle Switch Port	Used to connect the toggle switch used to turn the master on/off.
Fuse	5A quick blow fuse.
USB Port	Used to connect USB devices such as memory drives or the RINEX button box used turn the Master switch ON or OFF.
Isolation Power Switch (IPS)	The IPS totally removes power from the controller; if the vehicle is started the AutoSPRAY 4080 will not start.
Spray Rate Controller Connector	Used to connect to the spray controller.
Power Connector	Used to connect to power input (12vDC).

3.4 Configuring the GPS

The AutoSPRAY 4080 will operate with almost any GPS receiver which can output a NMEA message. In order for the AutoSPRAY 4080 to function correctly the GPS receiver must be configured to the following parameters;

NMEA message	GGA & VTG
Update rate	5Hz
Baud rate	19,200 baud (optional settings)

Instructions for configuring the Trimble EZ-Guide ® and Outback® GPS Guidance are provided in Appendices I & J. For all other GPS receivers or guidance system refer to the manufacturers manual.

Connect the GPS receiver to the GPS port on the back panel of the AutoSPRAY 4080 Controller as described in Section 2.4. Once the GPS has been connected it will be necessary to check that the GPS messages are being correctly received by the AutoSPRAY 4080 controller.

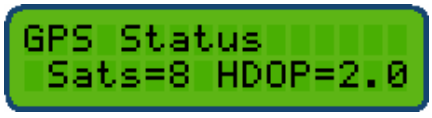
Configuring the GPS Baud Rate

It is important that the AutoSPRAY 4080 is configured with the correct GPS baud rate. Select the correct baud rate according to your GPS receiver by editing the Baud value in the GPS Menu.

Connecting GPS

The GPS is connected via a serial cable from the GPS receiver to the GPS port on the Back Panel of the AutoSPRAY 4080. See Figure 3-3 on page 20.

GPS Status



The GPS Status displays the number of satellites that are observed and the current HDOP (Horizontal accuracy indicator).

For Good GPS, the number of satellites must be greater than 4.

For Good GPS the HDOP should be less than 10.0. A HDOP of greater than 10.0 will result in Poor GPS.

DGPS Requirements

The AutoSPRAY 4080 by default requires differentially corrected GPS (DGPS) data which provides a more accurate position and enhances the overall performance of the system. However the AutoSPRAY 4080 can be configured to operate on GPS data only, which is done by editing the DGPS Required Menu.

GPS Health

The GPS Health is constantly indicated on the GPS status LED as denoted by the colour of the LED. Further information on the GPS health is also provided on the screen by a series of status messages.

GPS Health Messages

Status	LED	Description
Good GPS	Green	Good DGPS data being received.
No DGPS	Red	Good GPS data is being received but no differential correction signal is received.
Poor GPS	Orange	Poor DGPS data is received, < 4 satellites or PDOP > 10. AS4080 will not function
No Time	Blank	Correct data type & baud rate, no GPS time or position.
No Pos	Blank	Correct data type & baud rate, no GPS position.
No NMEA	Blank	Invalid data being received.
No Data	Blank	There is no data being received through the GPS port.

In order for the AutoSPRAY 4080 to be operational the GPS LED must be Green if the DGPS Required option is set to YES. If the DGPS Required option is set to NO the GPS LED can be Red or Green.

GPS Alarms

The AutoSPRAY 4080, when in the OPERATIONAL mode with the Master Control switch ON, will provide an audible alarm in the following situations:

- **DGPS Required YES**

  Whenever the LED changes state from GREEN
- **DGPS Required NO**

  Whenever the LED changes state from RED or GREEN

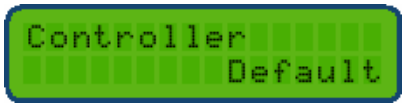
The cause of the alarm should be investigated, and rectified, before continuing to use the AutoSPRAY 4080.

3.5 Configuring the Spray Rate Controller

The spray rate controller may not need to be configured to operate with the AutoSPRAY 4080. However it is necessary that one switch is selected as the Master switch, which controls when both the AutoSPRAY 4080 and the spray rate controller should be ON or OFF.

When the AutoSPRAY 4080 is in OPERATIONAL MODE (controlling the section switches), the individual boom section switches are to be in the OFF position.

Selecting the Spray Rate Controller



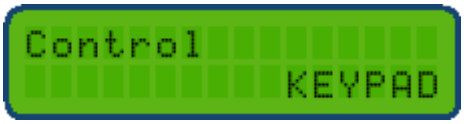
The AutoSPRAY 4080 can be configured to work with different types of spray rate controllers. From the Parameters menu, select the required controller from the options available. The Default option will suit most generic spray rate controllers.

Master Control

The Master Control setting is used to determine which device will be used to control the master on/off. The selections are as follows:

Control Setting	Device Used
Toggle	The Toggle Switch (optional device),is connected to the Toggle Switch port on the back panel.
External	The Master switch on the spray rate controller.
Keypad	The Standby Button on the front panel keypad of the AutoSPRAY 4080 controller.
Button Box	The RINEX Button Box (optional device), is connected to the USB port on the back panel.

Select the appropriate device via the Control setting in the Parameters Menu.



3.6 Configuring the Vehicle and Boom

When setting up the AutoSPRAY 4080 for the first time or for use in a new vehicle, there are various settings that must be configured for AutoSPRAY 4080 to function correctly and accurately.

The AutoSPRAY 4080 models the movement of the entire spray rig, whether it is a self propelled boom spray or a trailed boom spray. This allows the true position of the spray boom and its orientation to be accurately computed for precise control when switching the boom sections ON and OFF.

The measurements as detailed in the following section are to be accurately measured on the spray rig and should be recorded in the accompanying Table for the vehicle type for future reference.

GPS Offset (Cross Track)

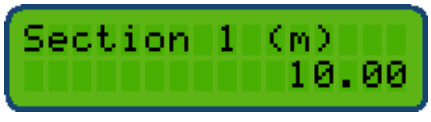
The distance between the centreline of the vehicle and the GPS antenna must be entered as the Cross Track value. Measure the distance and enter a positive value if the antenna is to the right of the centreline of the vehicle as viewed from the rear of the tractor facing forwards. Enter a negative value if the antenna is to the left of the centreline of the vehicle as viewed from the rear of the tractor facing forwards. The Cross Track value can be edited in the GPS Menu.

GPS Offset (Long Track)

The distance from the GPS antenna to the centreline of the front axle on the spray vehicle. If a front boom is used the Long Track measurement is to the flow point of the boom and not the front axle.

Boom Settings

The Boom Settings determine the overall width of the spray boom being used. Enter the number of boom sections and the width of each section in the Boom Width Menu.



Link and Axle Distances

The Link and Axle distances are used when determining the path of the spray rig as it moves around the field.
The Link and Axle distances should be measured as follows:

Link Setting	Measurement
Link 1	Link 1 is measured from the front axle centreline to the vehicle hitch point.
Axle 1	Axle 1 is measured from the rear axle of Link 1 to the hitch point of Link 1.
Link 2	Link 2 is measured from the hitch point of Link 1 to the hitch point or the flow point if it is the last link.
Axle 2	Axle 2 is measured from the rear axle of Link 2 to the pivot point of Link 2.
Link 3	Link 3 is measured from the hitch point of Link 2 to the flow point.
Axle 3	Axle 3 is measured from the rear axle of Link 3 to the flow point.

See Section 3.7 for an illustration of the Link Settings for different vehicle types.

The number of Links and the Link and axle distances can be edited in the Vehicle Menu

3.7 Measuring Vehicle & Boom offsets

For precise control of the AutoSPRAY 4080 it is necessary that all measurements are accurately recorded and entered into the system. Some of the measurements required will be unique to the vehicle configuration, a self-propelled sprayer or tow behind, and the following diagrams indicate the measurements required.

Select the type of vehicle and record the settings necessary on the accompanying pages.

Self-Propelled Vehicle

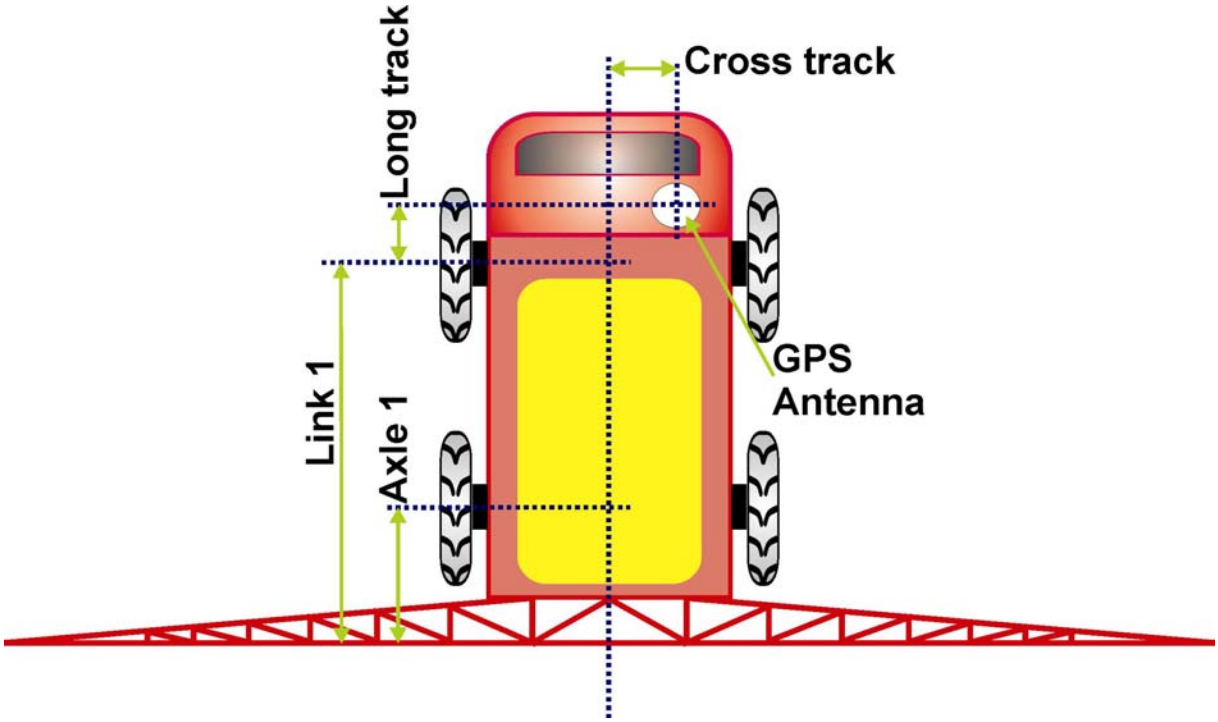


Figure 3-9 – Self Propelled Vehicle

Self-Propelled vehicle settings

Vehicle Measurements

Number of Links	1		
Link 1		Axle 1	
Cross track		Long track	

Boom Details *

Number of Sections			
Section 1		Section 5	
Section 2		Section 6	
Section 3		Section 7	
Section 4		Section 8	

*NOTE : Enter the number of sections, and the width of each section in the overall configuration.

Boom Spray Parameters

Master Control			
Tolerance		Search Width	
Latency On		Latency Off	

Tow Behind Vehicle

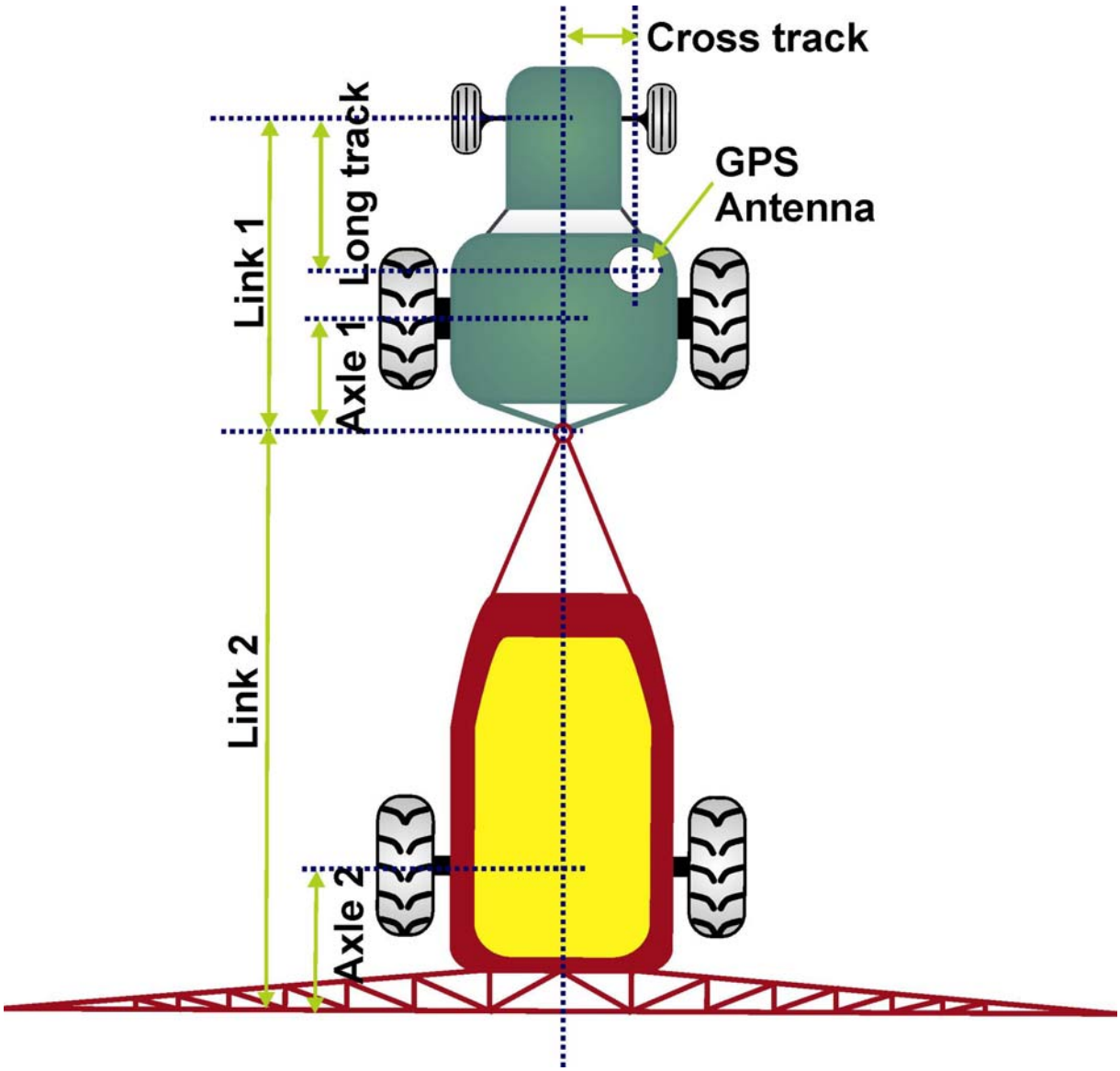


Figure 3-10 – Vehicle Measurements

Tractor with tow behind boom spray settings

Vehicle Measurements

Number of Links			
Link 1		Axle 1	
Link 2		Axle 2	
Link 3		Axle 3	
Cross track		Long track	

*NOTE : Enter the link and axles which correspond to the number of Links in the overall configuration.

Boom Details *

Number of Sections			
Section 1		Section 5	
Section 2		Section 6	
Section 3		Section 7	
Section 4		Section 8	

*NOTE : Enter the number of sections, and the width of each section in the overall configuration.

Boom Spray Parameters

Master Control			
Tolerance		Search Width	
Latency On		Latency Off	

Self-Propelled Vehicle (front mounted boom)

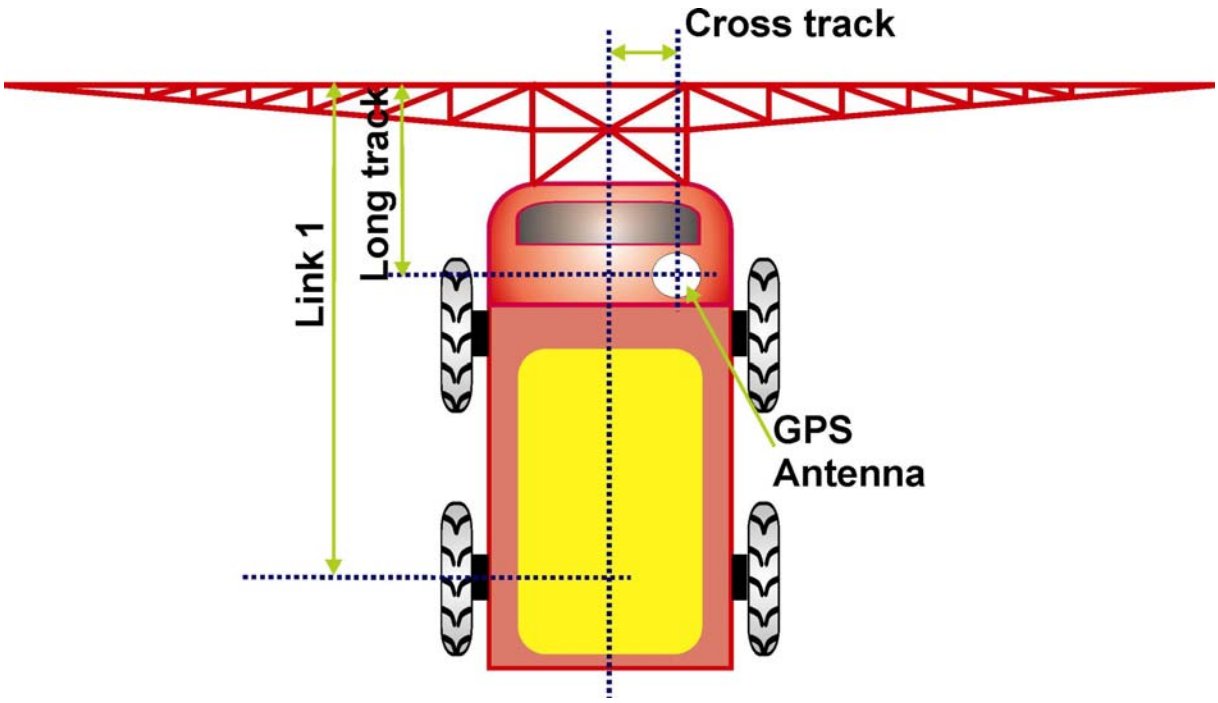


Figure 3-12 – Vehicle Measurements

Self-Propelled vehicle settings (front mounted boom)

Vehicle Measurements

Number of Links	1		
Link 1		Axle 1	0.0m
Cross track		Long track	

*NOTE : Enter the link and axles which correspond to the number of Links in the overall configuration.
Ensure that the Front Boom is set to YES in the Vehicle Menu.
The Long Track must be entered as a negative value.

Boom Details *

Number of Sections			
Section 1		Section 5	
Section 2		Section 6	
Section 3		Section 7	
Section 4		Section 8	

*NOTE : Enter the number of sections, and the width of each section in the overall configuration.

Boom Spray Parameters

Master Control			
Tolerance		Search Width	
Latency On		Latency Off	

Articulated Tractor with Tow-behind

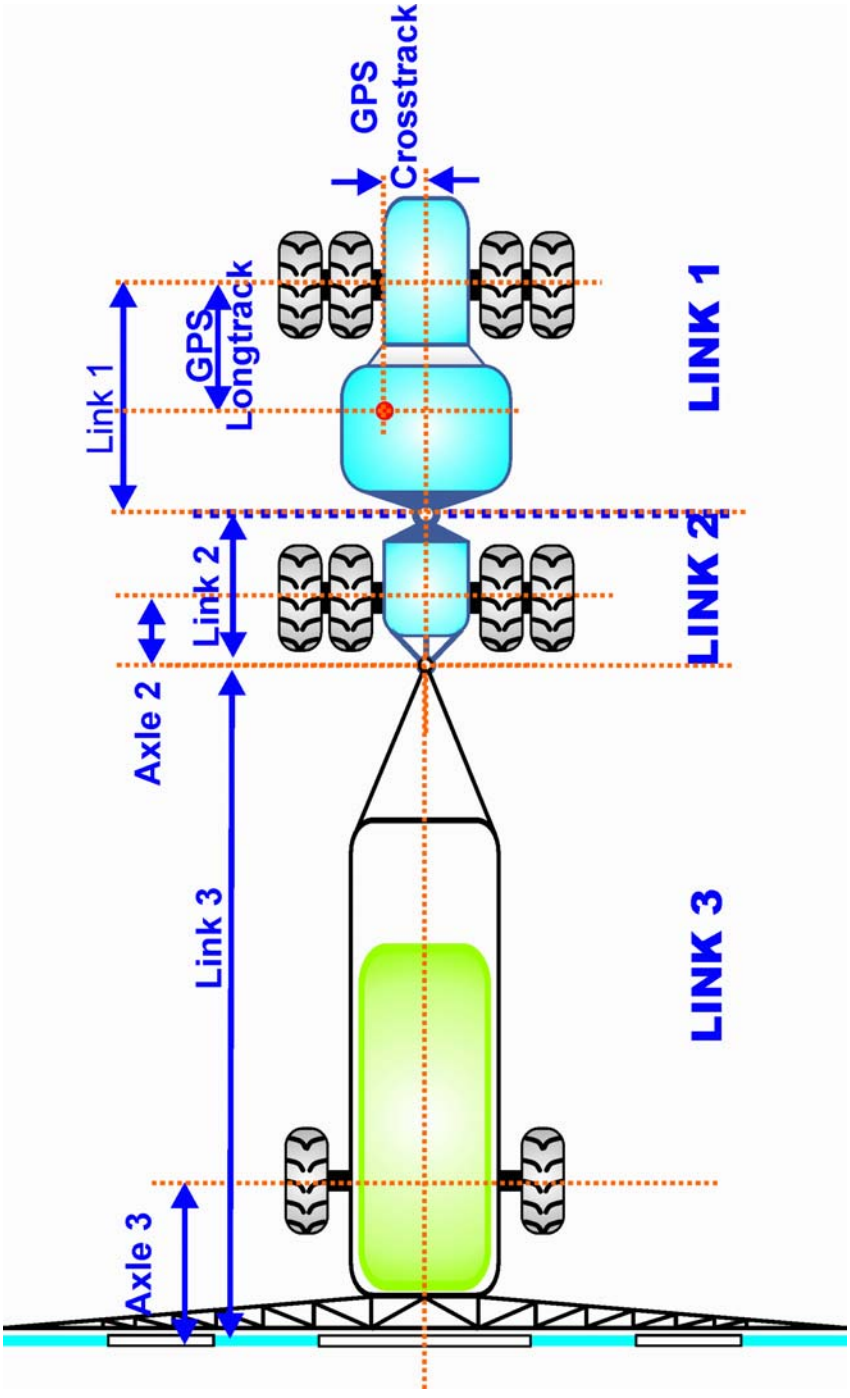


Figure 3-13 – Vehicle Measurements

☞ *Axle1 measurement is the same as Link1 value for this vehicle type.*

Articulated Tractor with tow behind boom spray settings

Vehicle Measurements

Number of Links			
Link 1		Axle 1	
Link 2		Axle 2	
Link 3		Axle 3	
Cross track		Long track	

*NOTE : Enter the link and axles which correspond to the number of Links in the overall configuration.

The Axle1 value is the same as the Link1 measurement for this vehicle type.

Boom Details *

Number of Sections			
Section 1		Section 5	
Section 2		Section 6	
Section 3		Section 7	
Section 4		Section 8	

*NOTE : Enter the number of sections, and the width of each section in the overall configuration.

Boom Spray Parameters

Master Control			
Tolerance		Search Width	
Latency On		Latency Off	

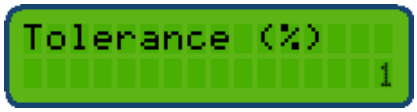
3.8 Configuring the Boom Spray Parameters

The following parameters are used when determining when to turn the sections ON and OFF. To optimize the usage of AutoSPRAY 4080 it is important that these settings are configured correctly.

Tolerance

The Tolerance is used to decide when to turn valves ON or OFF. When set to its default of 1%, the system will turn the valves on whenever any part of the sensed area has not been sprayed. It is effectively the percent of miss that the system will tolerate. If the value is increased, the system will not turn the valves on when traversing over a small missed area such as a line between two spray swaths.

The Tolerance value can be edited in the Parameters Menu.

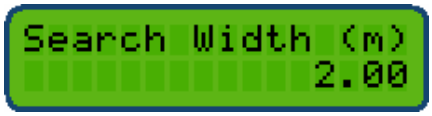


Search Width

NOTE: This is an advanced tuning parameter and should only be changed from its default value under instruction from authorised support personnel.

This value defines the amount of overlap allowed when turning the valves ON before leaving a sprayed area such as an end zone. Hence if the value is set to 2m (default) the spray section should turn on 2m before any part of the section reaches and unsprayed area. This can be used to decrease errors caused by inaccurate GPS positioning. When entering a previously sprayed area, the system will attempt to turn OFF at exactly the correct time.

The Search Width value can be edited in the Parameters Menu.



Latency ON

Latency ON is used to compensate for any time delay between the time the system requests the valves to open and the actual time that this

takes place. For example, if it takes one second for a valve to open, a Latency ON value of one second should be entered. In this case the signal to open the valve will be sent one second before the valve needs to open.

Latency OFF

Latency OFF is opposite to Latency ON and is used to compensate for any time delay between the time the system requests the valves to close and the actual time that this takes place.

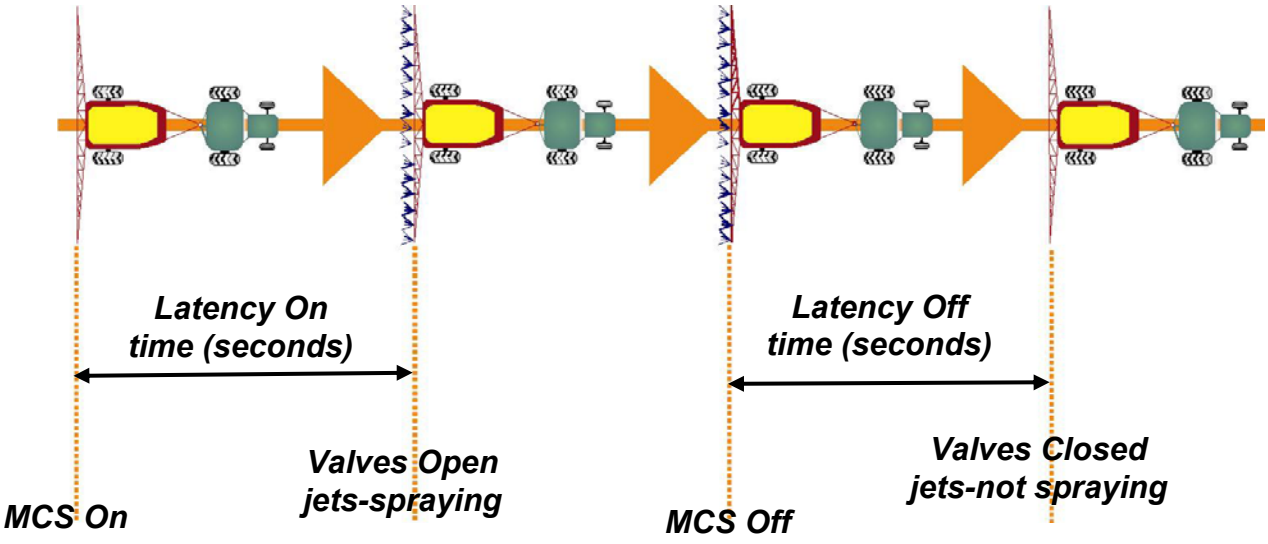
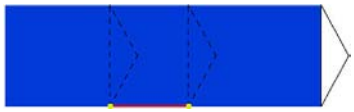
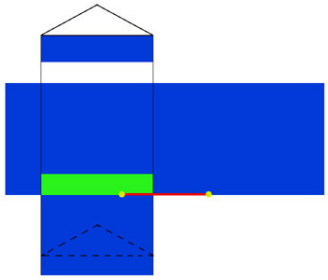
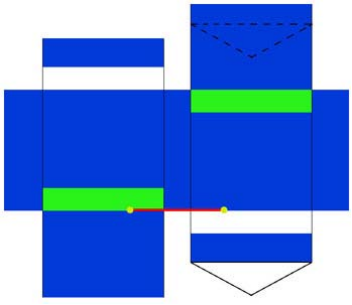


Figure 3-13: AutoSPRAY 4080 Latency values

Measuring Latency

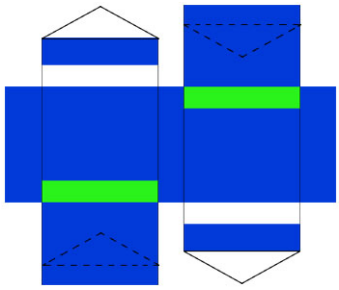
The quickest way to estimate the latency of the sprayer is to use a stop watch, turn a spray section on and time the delay between this action and when spray is coming out the nozzle onto the crop. This may be a very small value (a few tenths of a second and hard to measure accurately).

For a more accurate measurement, use the following procedure:

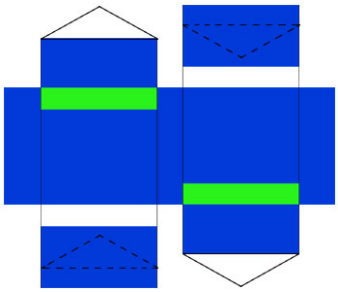
Step	Instruction	Diagram
1	Drive slowly in a straight line down the field for 200m with the sprayer on. The tank should have water only for the purpose of this exercise. Have another person mark the end nozzle of the boom with two pegs and a rope half way along the spray run.	
2	At right angles to the pervious spray run, spray at 20km/hr across the spray mark with one end of the boom crossing over the rope. Ensure that you have allowed enough distance before crossing over the line for the boom trailer to straighten up behind the tractor. Have someone measure the distance from the rope to where the sprayer actually reacted.	
3	Repeat step 2 in the opposite direction.	
4	**Metric Calculations** If Speed(km/h) = The speed of the vehicle in kilometres per hour	

Step	Instruction	Diagram
	Distance(m) = The distance from the rope to where the sprayer reacted in metres. Calculate the latency using this formula: **Latency(s) = Distance(m) ÷ Speed(km/h) x 3.6** For example Assuming the operator was traveling at 20km/hr and the distance from the rope to where the sprayer reacted is 5 metres: Latency(s) = 5(m) ÷ 20(km/h) x 3.6 = 0.9 seconds.	
5	**Imperial Calculations** If Speed(mph) = The speed of the vehicle in miles per hour. Distance(ft) = The distance from the rope to where the sprayer reacted in feet. Calculate the latency using this formula: **Latency(s) = Distance(ft) ÷ Speed(mph) x 0.68** For example Assuming the operator was traveling at 12mph and the distance from the rope to where the sprayer reacted is 16ft: Latency(s) = 16(ft) ÷ 12(mph) x 0.68 = 0.9 seconds Often the latency time for the sprayer to switch on will differ from the time to switch off. Enter each value into the Latency ON and Latency OFF menu options.	
6	Repeat steps 1 to 4, altering the latency figure by plus or minus 0.1 seconds, until the optimum result is achieved.	

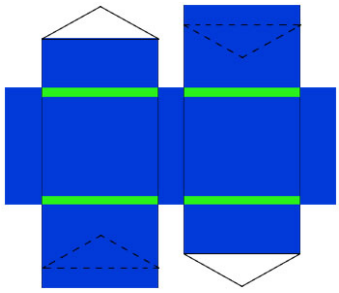
The following examples show possible scenarios and how to resolve the latency settings for optimum control of the AutoSPRAY 4080.



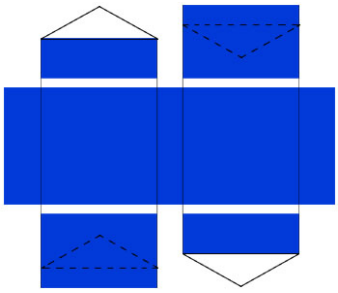
Latency set too low



Latency set too high



Optimum Latency setup



Abnormal situation, increase search width

3.9 Self Test the AutoSPRAY 4080

Prior to using the AutoSPRAY 4080 for the first time the AutoSPRAY 4080 Self Test should be completed to ensure that all components are correctly installed and operational.

The Self Test is used to check the AutoSPRAY 4080 is communicating correctly with the spray controller. It starts with a test of system sound and then turns ON each section for three seconds each. To start the Self Test, set the Self Test Page to “Yes”. The left most boom section (when looking from behind the boom) will come on first. When the section test is finished it tests the Master for general ON/OFF switching.

☞ *The Self Test Function is accessible only after turning the Master on.*

4

Using AutoSPRAY

This section describes the modes of operation when using the AutoSPRAY 4080 and also contains a guide on how to spray a field using the AutoSPRAY 4080.

4.1 Modes of Operation

The AutoSPRAY 4080 has two modes of operation, STANDBY and OPERATIONAL. In addition to this the AutoSPRAY 4080 has two non-operational modes, OFF and NON-POWERED.

The Power LED on the front panel of the AUTOSPRAY 4080 will indicate the mode of operation. The following notes describe the various modes.

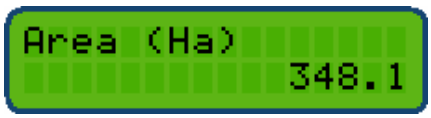
Mode	LED	Operation
NON-POWERED	Blank	The AutoSPRAY 4080 is not powered at all when the unit is either not connected to a DC power supply or the Isolation Power Switch is OFF.
OFF	Red	The AutoSPRAY 4080 is connected to a power supply and the Isolation Power Switch is ON. Once the AutoSPRAY 4080 senses 12vDC on the ignition wire the unit will switch ON to the OPERATIONAL mode.
STANDBY	Orange	When the system is in STANDDBY mode, the spray controller can be used to manually control the sections. The LCD will display STANDBY MODE. Press the Standby Button on the front panel keypad to enter STANDBY Mode. Press it again to enter OPERATIONAL mode.
OPERATIONAL	Green	When the system is not in STANDBY mode, it is in OPERATIONAL mode. When in OPERATIONAL mode, the AutoSPRAY 4080 records treatment data as the field is sprayed and uses this information to turn the boom sections ON and OFF accordingly.

☞ *In STANDBY mode the* AutoSPRAY 4080 *does not record any spraying completed when in this mode. STANDBY mode is used when the operator wishes to manually override the AutoSPRAY 4080*

☞ *In OPERATIONAL Mode the LCD will display the menus which can be navigated. When the Master switch is ON and treatment data is being recorded, configuration settings cannot be edited.*

4.2 Using AutoSPRAY to Spray a Field

The following is a step by step guide to commence spraying a field using the AutoSPRAY 4080.

Step	Instruction
1	Start the AutoSPRAY 4080 by turning the vehicle ignition ON. Wait until the LCD on the front panel is operational and displays the menu (This may take approximately one minute.).
2	Check that the Power and GPS LEDs on the AutoSPRAY 4080 front panel are green.
3	Turn the spray rate controller ON, all boom section switches are to be in the OFF position.
4	Turn the spray rate controller Master switch to the ON position.
5	Start to move the vehicle forwards. The boom sections will automatically switch ON as the vehicle moves over a non-treated area and will switch OFF over a treated area which has been recorded by the AutoSPRAY 4080.
6	As the field is being treated, various status information can be viewed from the Display Menu. Information such as area treated and the percentage of overlapped area can be viewed in this menu. 
7	When the field has been treated, turn the Master switch OFF.
8	If you wish to stop working, simply turn the vehicle ignition off to shutdown the AutoSPRAY 4080.
9	If you wish to continue working in a different field, see section 4.3 on starting a New Field.

Reversing the Vehicle

The AutoSPRAY 4080 typically assumes that the vehicle is always moving in a forward direction and that the boom sprayed is towed from the rear of the tractor. The vehicle modelling features incorporated in the AutoSPRAY4080 uses this logic to compute the position of the boom.

However when a tractor reverses, such as reversing the boom into a corner of a field, the AutoSPRAY 4080 will only be aware that the vehicle is reversing if the Master Switch is in the OFF position. This will be confirmed by an audible alarm (series of short beeps).

Hence the logic rule that applies is as follows:

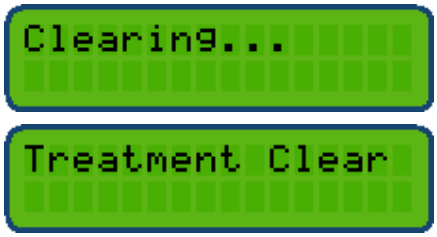
If the Master switch is ON the vehicle is moving forward. If the Master switch is OFF, the vehicle can be moving backwards.

When moving the vehicle into the field to start spraying, the AutoSPRAY 4080 should only be powered up when the vehicle is moving forwards, or is about to move in a forward direction.

4.3 Starting a New Field

When a field has been sprayed, it is important that the field is reset to begin spraying a new field.

To reset the field, hold down the Standby Button on the front panel keypad for a few seconds until the screen displays “Clearing…”. The message “Treatment Clear” will be displayed when the field has been successfully cleared.



☞ *All data in the field will be lost when the field is reset.*

4.4 Creating Field Zones

The AutoSPRAY 4080 can be used to create zones within a field which can be set as an exclusion, or inclusion zone. The inclusion zone defines where the AutoSPRAY 4080 will permit spraying activities, ie the field which is being sprayed. The exclusion zone defines areas where the AutoSPRAY 4080 will prevent spraying activities, ie may be used to prevent spray in a water course. An example of a field divided into zones is shown in Figure 4.1.

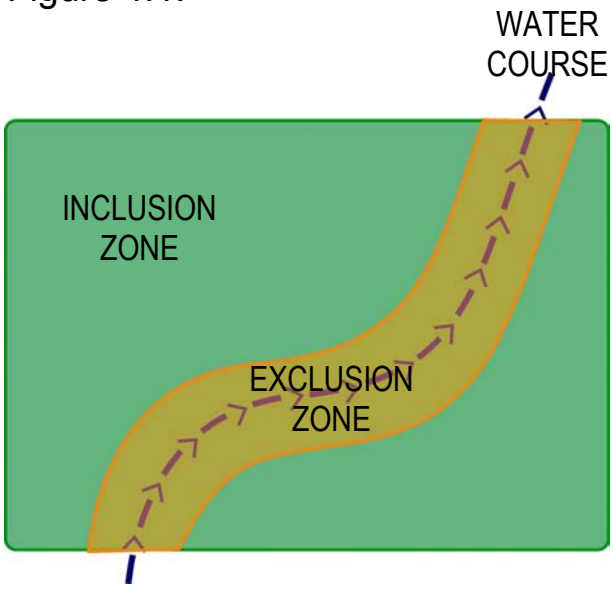


Figure 4.1 Field with Inclusion and Exclusion Zones

As the spray boom crosses into the exclusion zone all sections will be shut OFF by the AutoSPRAY 4080. The sections will be switched ON once the spray boom returns to the inclusion zone.

Zone boundaries are created by first choosing the zone type, and then driving around the perimeter of the zone with the vehicle. The zone status must be set to **RECORD** while the boundary is being defined, and is set to **END** when the boundary driving is complete. The recording may be **PAUSED** to allow for detours due to creeks etc.

It is not necessary to set either an exclusion or inclusion zone for the AutoSPRAY 4080 to function correctly. It is possible to set only an exclusion zone where the AutoSPRAY 4080 will shut OFF the boom sections.

The following steps describe how to set an exclusion zone in a field. This is shown in the examples depicted in Figure 4.2 and 4.3.

Step	Instruction
1	With the AutoSPRAY 4080 in Standby mode drive to one point on the perimeter of the exclusion zone
2	Move to the menu **BOUNDARY**
3	Move to the sub-menu **Map Point** and select the appropriate point from which the zone is to be mapped (Right boom tip for the example shown)
4	Move the sub-menu **B2-Exc** and set to **RECORD**
5	Drive the vehicle along the perimeter of the exclusion zone keeping the right boom tip where the exclusion zone is to be set
6	Once the vehicle has completed the perimeter lap of the exclusion zone move to the sub-menu **B2-Exc** and set to **END**
7	The exclusion zone has now been defined as shown in Figure 4.3
8	To activate the exclusion zone move to sub-menu **B2-Exc** and set to **ON**

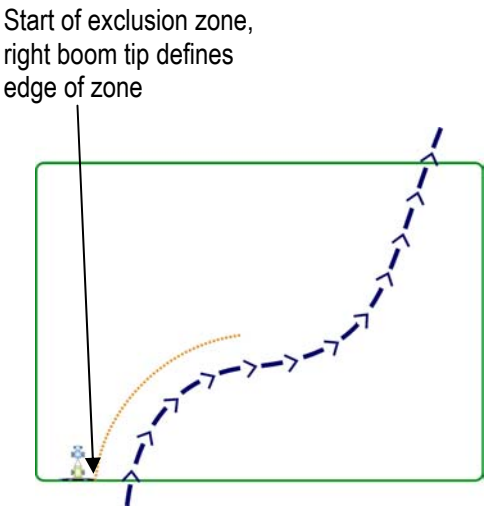


Figure 4.2
Start of Exclusion Zone

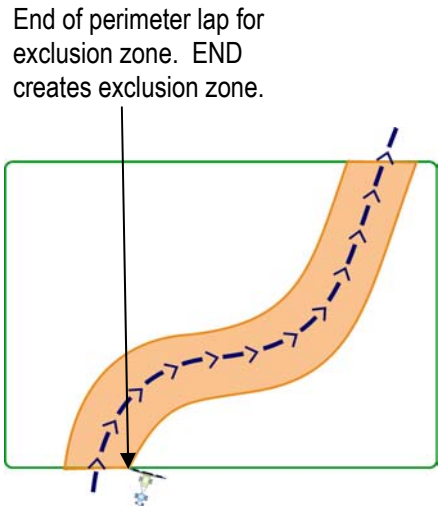


Figure 4.3
End of Exclusion Zone

4.5 Using Manual Override

The OVERRIDE Function is used to manually override the status of the system so that selected sections are fixed to ON or OFF and are not controlled by the AutoSPRAY 4080. OVERRIDE allows fixing sections to OFF on one side of the boom as the boom hangs over a boundary that is not required to be sprayed.

OVERRIDE status can be changed using the Override setting in Setup menu.

Override Status	Action
Disabled	Used to switch OVERRIDE Function off. This is the default setting.
OFF	Sets selected boom sections to OFF
ON	Sets selected boom sections to ON.

To activate and deactivate OVERRIDE, the status must first be set to ON or OFF as described above. Then pressing the Enter button, ◎ while in any Menu Title screen, will set OVERRIDE function to active.

While OVERRIDE is active, select sections to override by pressing the ◀ ▶ buttons.

Press Enter ◎ again to save changes.

Press the Standby ⏻ button to reset all changes.

Press ▼ ▲ to leave the OVERRIDE Menu. All changes not saved by ◎ will be cancelled.

☞ *OVERRIDE Function is accessible only while the Master is ON.*

☞ *Restarting the system [or clearing the field] will reset any sections which were previously set to OVERRIDE.*

5

The Menu System

This section describes how to navigate the menus of the system.

Furthermore, this section describes each menu, the individual menu items and their usage.

5.1 Navigating the Menus

The AutoSPRAY 4080 Menu system is used to view and change settings.

Use the ▲ ▼ buttons to move between menus.

Use the ◄ ► buttons to move between sub-menus.

Press the Enter button ◎ to select a sub-menu item for editing.

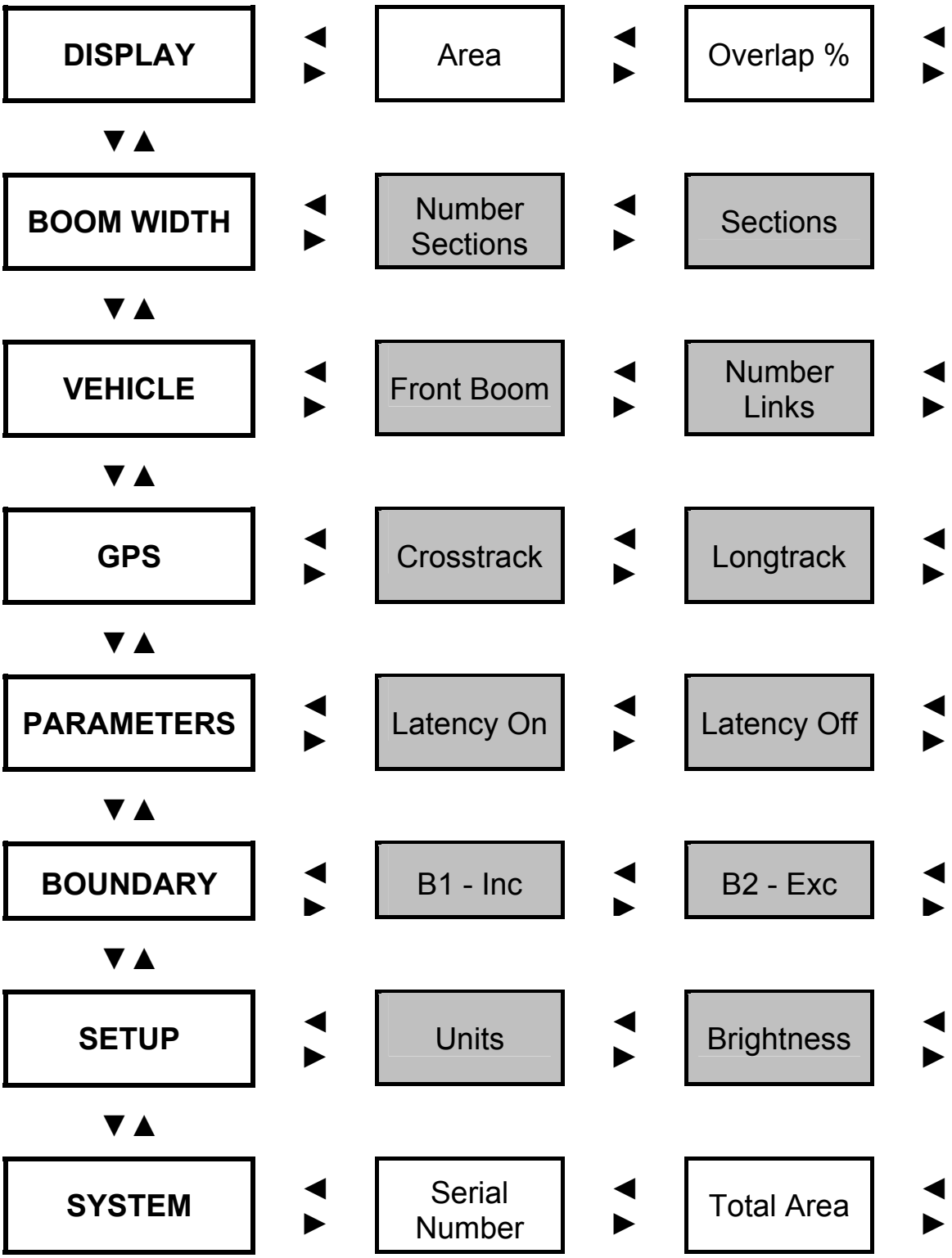
The following is an example on how to change the number of boom sections.

Step	Action	Result
1	Press ▼	
2	Press ►	
3	Press ◎	
4	Press ▲ or ▼	Value changes
5	Press ◎	Value Saved

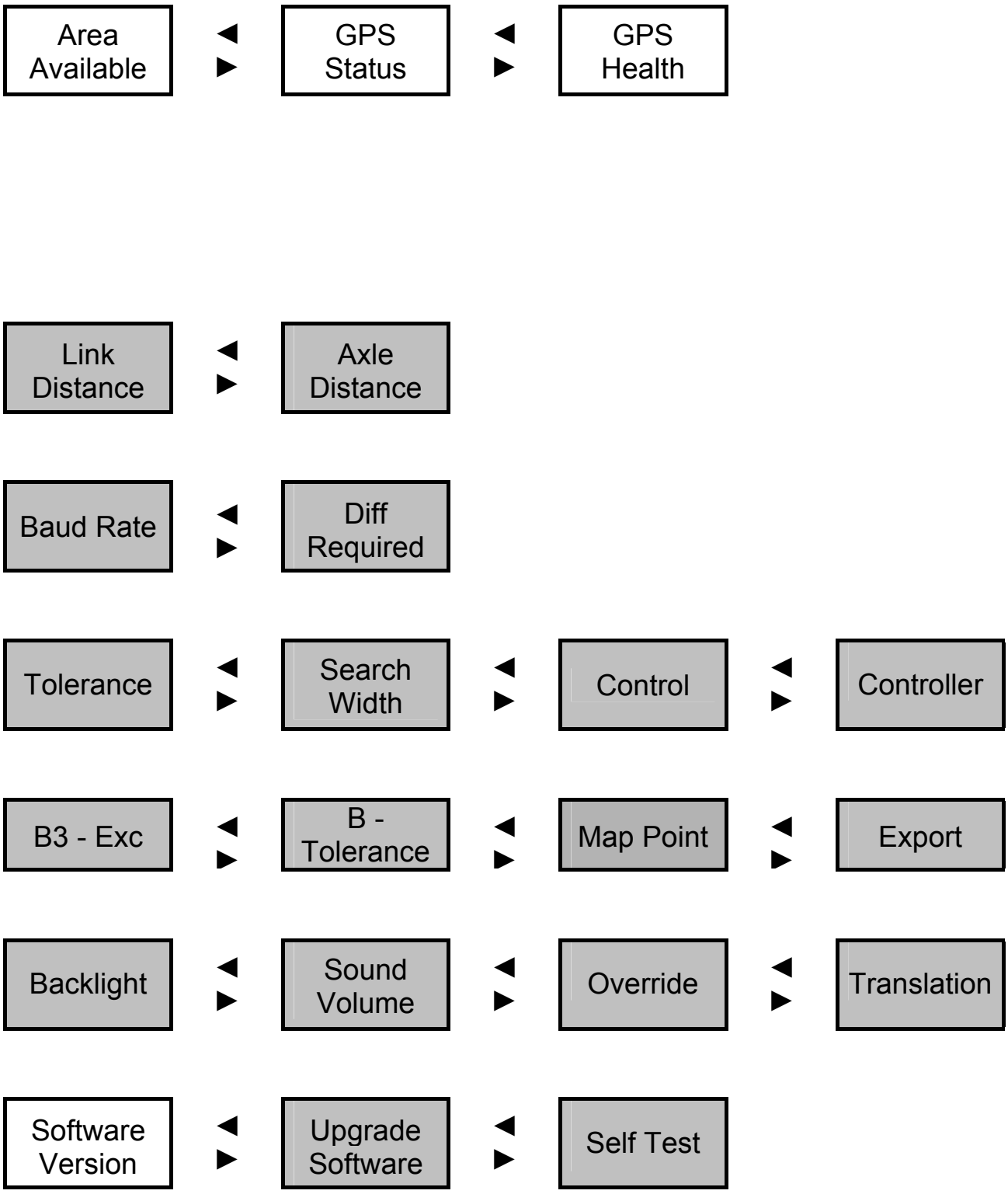
☞ *Sub-menus cannot be edited when spraying. The System Message will be displayed.*

☞ *To change the digit to be edited, press the ◄ or ► keys until the correct digit is highlighted.*

5.2 The Menu Hierarchy



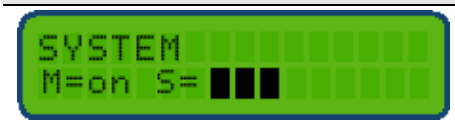
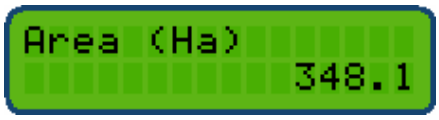
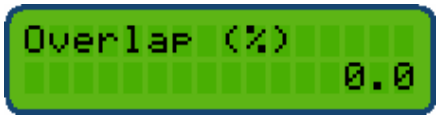
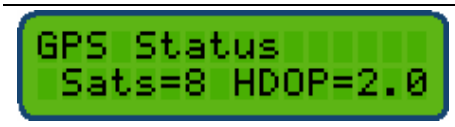
☞ *Master and Section status information is shown on each sub-menu title screen.*



☞ *Menu Items shaded in grey can be edited when not spraying.*

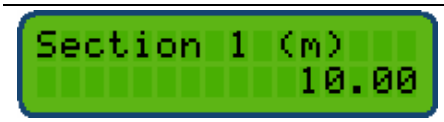
5.3 The Display Menu

The Display Menu contains information related to the field that is being currently worked.

Menu Item	Edit	Description
	☒	The menu title. The Master and Section status. **M** represents the current master status (on or off). **S** represents the current status of each boom section. Each boom section is represented by a small rectangle. If the rectangle is shaded in black, the boom section is on.
	☒	The area treated in the current field.
	☒	The percentage of overlapped area in the current field.
	☒	The area available on the system before the field must be reset (maximum is 2000 ac when then field is reset).
	☒	Displays GPS status information. **Sats** = The number of GPS satellites available. There must be at least 4 satellites for the system to be operational. **HDOP** = The horizontal accuracy indicator. The HDOP must be less than 10.0 for the system to be operational.
	☒	The GPS Health indicator. See Section 3.4

5.4 The Boom Width Menu

The Boom Width Menu displays the current boom settings and allows them to be edited.

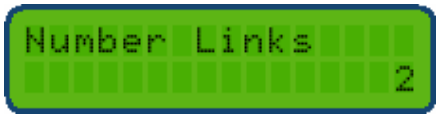
Menu Item	Edit	Description
	☒	The menu title. The Master and Section status. **M** represents the current master status (on or off). **S** represents the current status of each boom section. Each boom section is represented by a small rectangle. If the rectangle is shaded in black, the boom section is on.
	☑	The number of boom sections. This setting will determine the number of section widths displayed in the following menu items (3 boom sections are shown in this example). Default = 1 Maximum = 8
	☑	The width of boom section 1. Default = 1m Maximum = 100m minus other section widths.

NOTE : The number of sections widths to be entered is determined by the number of sections entered. Only one section width is shown in the Swath Menu above.

☞ *The maximum total width of all boom sections is 100 m.*

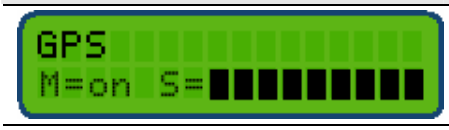
5.5 The Vehicle Menu

The Vehicle Menu displays the current vehicle settings and allows them to be edited.

Menu Item	Edit	Description
	☒	The menu title. The Master and Section status. **M** represents the current master status (on or off). **S** represents the current status of each boom section. Each boom section is represented by a small rectangle. If the rectangle is shaded in black, the boom section is on.
	☑	Determines whether a Front Boom is being used on the spray rig. When a front boom is selected the number of Links should be set to 1 Default = No
	☑	The number of links on the vehicle. This number will determine the number of link and axle measurements required in the following menu items. Default = 1 Maximum = 3
	☑	The length of link 1. See Chapter 3 for link 1 measurement points. Default = 5m Maximum = 40m
	☑	The length of axle 1. See Chapter 3 for axle 1 measurement points. Default = 1m Maximum = Length of Link 1

5.6 The GPS Menu

The GPS Menu displays information related to GPS and allows the GPS settings to be edited.

Menu Item	Edit	Description
	☒	The menu title
	☑	The GPS antenna offset measured from the centreline of the vehicle. Enter a **positive** offset if the antenna is offset to the right of the centreline or a **negative** offset if the antenna is offset to the left of the centreline. As viewed from the rear of the tractor facing forwards. Default = 0m Maximum = 100m
	☑	The GPS antenna offset measured to the front axle of the vehicle. Default = 0m Maximum = 100m
	☑	The GPS input baud rate. The available baud rates are 4800, 9600, 19200, and 38200. Default = 19200 ☞ *Ports settings: Data bits = 8, Parity = None, Stop bits = 1.*
	☑	Determines whether DGPS is required to operate the system. Default = Yes

5.7 The Parameters Menu

The Parameters Menu displays settings that effect the operation of AutoSPRAY 4080 and allows them to be edited.

Menu Item	Edit	Description
	☒	The menu title. The Master and Section status. **M** represents the current master status (on or off). **S** represents the current status of each boom section. Each boom section is represented by a small rectangle. If the rectangle is shaded in black, the boom section is on.
	☑	The difference between electronic and mechanical switching on. Default = 0.01 seconds Maximum = 10.00 seconds
	☑	The difference between electronic and mechanical switching off. Default = 0.01 seconds Maximum = 10.00 seconds
	☑	The tolerance used for shutting the sections ON or OFF. Default = 1% Maximum = 99%
	☑	NOTE: This is an advanced tuning parameter and should only be changed from its default value under instruction from authorised support personnel. Default = 2.00m Maximum = 10.00m
	☑	Defines the method used to control the master. Default = KEYPAD

Menu Item	Edit	Description
		Options: KEYPAD,BUTTON BOX, EXTERNAL, and TOGGLE SWITCH
	☑	Defines the external spray controller type. Default = Default Options: Default, SP6555, JOHN DEERE,HARDI,FLEXCONTROL, BA7000, HARDI MUSTANG

☞ *See sections 3.5 & 3.7 for further details.*

5.8 The Boundary Menu

The Boundary Menu displays information related to exclusion and inclusion zones and allows them to be edited.

Menu Item	Edit	Description
	☒	The menu title. The Master and Section status. **M** represents the current master status (on or off). **S** represents the current status of each boom section. Each boom section is represented by a small rectangle. If the rectangle is shaded in black, the boom section is on.
	☑	The current status of the inclusion zone. Default = NOT SET Options: RECORD, END, ON, OFF
	☑	The current status of the exclusion zone settings for area 2. Default = NOT SET Options: RECORD, END, ON, OFF
	☑	The current status of the exclusion zone settings for area 3. . Default = NOT SET Options: RECORD, END, ON, OFF
	☑	The tolerance percentage value that is used for both inclusion and exclusion areas Default = 1 Max = 100
	☑	Sets the point on the boom that is used for mapping boundaries. Default = CENTRE Options: LEFT, RIGHT

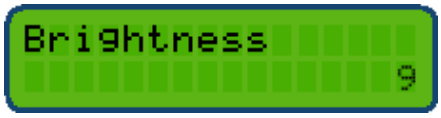
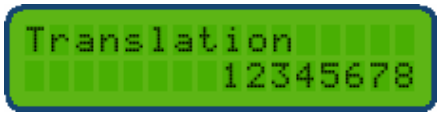
Menu Item	Edit	Description
	☑	Enables or disables the option to export defined boundaries. Default: NO Options: NO, YES.

☞ *When recording a boundary, the options are available to pause and resume recording. When resuming recording, the system will draw a straight line from the pause location to the resume location, and then continue recording.*

☞ *The maximum length of any boundary is 5Km. A warning message will be displayed if this limit is reached.*

5.9 The Setup Menu

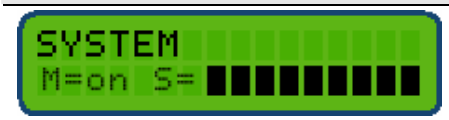
The Setup Menu displays various settings and allows them to be edited.

Menu Item	Edit	Description
	☒	The menu title.
	☑	Defines the units of the system. Default = Imperial. Options: Metric, Imperial
	☑	The brightness of the LCD backlight. 9 = Brightest. Default = 9 Maximum = 9
	☑	Turns the backlight on/off. Default = On
	☑	Used to adjust the sound volume. Set this value to zero to turn the sound completely off. 9 = Loudest. Default = 5 Maximum = 9
	☑	Enables or disables OVERRIDE function. *See section 3.5 for further details.* Default = Disabled
	☑	Allows for the transposition of the boom section outputs. Change the order of the digits to translate the boom section outputs. Note: there must be no duplicated digits.

☞ *The self test feature can be used to check the Translation function. See section 5.9*

5.10 The System Menu

The System Menu displays various system settings.

Menu Item	Edit	Description
	☒	The menu title.
	☒	The system serial number.
	☒	Displays the total area covered by the system in its life time. This value will increase as area is treated and will not be reset when the field is reset.
	☒	The software version number.
	☑	Allows the software to be upgraded. Contact your local agent for software upgrade information. Default = NO Options: YES, NO
	☑	Allows a Self Test to be run on the system. Individual boom section outputs, system volume and status LED's are exercised. Default = NO Options: YES,NO

Appendices

Appendix A Glossary

Phrase	Description
AutoSPRAY	A system which can automatically control the state of the boom section switches, ie ON or OFF
Master	The switch, regardless of whether it be on the spray rate controller or not, that will control when the physical boom sections will commence and cease spraying
Link	The distance measured along the length of the vehicle between Pivot points on the vehicle
Translation	Changing the boom section outputs. For example: Boom section 1 output may be set to activate boom section 2 valves, and vice-versa.
Standby Mode	The AutoSPRAY 4080 will not control the boom section switches, and ignores any spraying done when in this mode.
Spray rate controller	A third party device, eg Raven 440, which controls the flow rate to the boom spray. The controller may have boom section switches on the face panel, or the boom section switches may be located elsewhere in the operators cabin, eg Hydrostat handle.

Appendix B AutoSPRAY 4080 Options

Part Nō.	Description	Usage
1-2810	Raven 4XX Adaptor Cable 5XX 6XX	Plug compatible cable for spray rate controller and the AutoSPRAY 4080 controller.
1-2800	Farmscan 24V1 Adaptor Cable	Plug compatible cable for spray rate controller and the AutoSPRAY 4080 controller.
1-2805	Generic AutoSPRAY Cable	For non-specified spray rate controller interface to the AutoSPRAY4080 controller. Controls up to eight sections and Master Switch.
1-2820	TeeJet 844 Adaptor Cable	Plug compatible cable for spray rate controller and the AutoSPRAY 4080 controller.
1-2262	Button Box	Used to turn the master ON and OFF. Connect via the USB port on the back panel.
1-2263	Foot Switch	Used to turn the master ON and OFF. Connect via the USB port on the back panel.
1-2260	Toggle Switch	Used to turn the master ON and OFF. Connect via the Toggle Switch port on the back panel.
1-2207	GPS cable	DB9F – DB9M serial cable straight through connections.
1-2208	GPS cable	DB9F – DB9F serial cable with cross-over connections.
1-2295	“Y” piece Data cable	D9F – D9M – D9M serial cable used as double adapter for GPS receiver, suits EZ-Guide®.
1-2296	“Y” piece Data cable	D9M – D9F – D9F serial cable used as double adapter for GPS receiver, suits Outback®.

Appendix C System Messages

System Messages will display when an event or error occurs.

Please record any message that could assist if support is required.

Message	Meaning
Turn Master Off	The master switch must be turned off before this function can be selected.
Clearing...	The current treatment is being cleared.
Treatment Clear	The current treatment has been successfully cleared.
STANDBY MODE	The system is in standby mode.
Upgrading...	The system software is being upgraded.
Upgrade Complete	The system software has been successfully upgraded.
Error: copying	An error occurred copying a file to or from the USB drive.
Error: rename	An error occurred when upgrading the software.
File not found	The file to upgrade was not found on the USB drive.
Please Reboot	Please reboot the system after changing baud rate or upgrading the software.
Copy Complete	The files were copied successfully to the USB drive.
Copying…	Files are currently being copied to the USB drive.
Width too large	The total width entered for the boom sections exceeds the maximum allowable width (100m)
RINEX	System is initializing
Soft Reset	A soft reset is being performed.
Hard Reset? No Yes	Do you want to perform a hard reset? Press arrow key beneath your choice.

Message	Meaning
Reset Failed	The reset failed.
Reset Complete	The reset completed successfully.
Loading...	The system is loading the current field.
Low Disk Space	Disk space is low.
Disk Space Full	Disk space is full.
Exiting...	The system is preparing to turn off.
Out of limit!	The system has travelled more than 10km from the starting point and is now out of limit.

Appendix D Troubleshooting

The AutoSPRAY 4080 is a robust system and should provide many years of trouble free service. In the unlikely event that something is not correct please check the following points before contacting your local dealer for service.

Problem	Probable Cause	Action
Boom sections do not switch OFF	Incorrectly wired	Check wiring
	No GPS signal	Check that GPS is being received
	Boom section switches are ON	Turn section switches OFF
	Miss Tolerance set too low	Check settings on Miss Tolerance
	Search Width set too high	Check settings on Search Width
	Master Switch incorrectly set	Check settings for Master Switch
Boom sections switches switch at the wrong time	GPS is inaccurate	Check with the GPS supplier
	Latency setting is set incorrectly	Check latency settings with boom sections
	Search Width is incorrectly set	Check settings on Search Width
Status LEDS don't light up	Fuse has blown	Replace Fuse
	IPS is switched OFF	Switch IPS ON
	Incorrectly wired	Check wiring to vehicle battery & ignition
NO GPS signal	Check GPS	Check that the connected GPS is turned ON and working
	Incorrect GPS settings	Check GPS settings match the GPS receiver
	Incorrect GPS cable	Check that the correct GPS cable is being used

Problem	Probable Cause	Action
Boom sections do not switch OFF	Incorrect cabling	Check that the spray rate controller cable is properly connected
	Incorrect Miss Tolerance settings	Check settings for Miss Tolerance
	Incorrect Master Switch settings	Check settings for Master switch
The wrong boom section(s) turn on and off.	Incorrect cabling	Check that the correct spray rate controller cable is connected.
	Non-standard boom section configuration	Use the Translation option to match the boom section configuration.
AS4080 will not power up	Incorrect cabling	The AS4080 has not been correctly installed, check the ignition wire
	IPS is OFF	Turn the IPS switch ON
AS4080 will not save settings after restart	Incorrect cabling	The AS4080 has not been correctly installed, check the ignition wire
	Not shutting down the unit correctly	Switch the AS4080 OFF by turning OFF The vehicle
AS4080 is very slow to respond	The last data file may be corrupt	Perform a soft reset as denoted in Appendix E, the hard reset should only be done as directed by an authorised technician
It is difficult to read the LCD screen	Check that the AS4080 is operational	Turn the system ON by starting the vehicle
	Check that the brightness is fully UP	Turn the brightness Up on the AS4080

Problem	Probable Cause	Action
It is difficult to hear the AS4080 alarms	Check that the volume is up	Turn the volume Up on the AS4080
	Check that the speaker enclosure is not covered	Remove any obstructions from the speaker
Warning message that the Master cannot be switched OFF	The Master switch is ON	Turn the Master switch OFF
	Incorrect cable in GPS port and settings for the Master	Check the Master switch setting is not toggle and that the GPS cable is the one supplied with the AS4080
System constantly beeps	No GPS	Check that the GPS is correctly configured and connected to the AS4080
	AS4080 considers that vehicle is going backwards	Turn the master on for 15 sec or more.
“File Not Found” message when upgrading software	Insufficient time to recognise upgrade media.	Wait 30seconds and then retry the upgrade operation.
Sections will not turn on inside part of an inclusion zone.	Zone boundary recorded incorrectly	Re-record the inclusion zone boundary.

Appendix E Resetting the System

Soft Reset

Performing a Soft Reset will clear all treatment data from the system prior to the program starting.

To Soft Reset the system:

1. Turn the system ON and watch the LCD display as it the system is powering up.
2. When the LCD displays RINEX, hold down the Standby Button on the AutoSPRAY 4080 front panel keypad until a sound is heard.
3. Release the Standby Button immediately.
4. Press the (DOWN) arrow key to select a SOFT reset.
5. “SOFT RESET?” is displayed for confirmation. Press the (RIGHT) arrow key to select “YES” to carry out the reset, or the (LEFT) arrow key to select “NO” to cancel the reset operation.
6. After the Soft Reset has been performed “Reset Complete” will be displayed and the software will continue to start with all treatment data cleared.

Hard Reset

Performing a Hard Reset will clear all treatment data from the system and reset all settings back to factory defaults.

To Hard Reset the system:

1. Turn the system ON and watch the LCD display as it the system is powering up.
2. When the LCD displays RINEX, hold down the Standby Button on the AutoSPRAY 4080 front panel keypad until a sound is heard.
3. Release the Standby Button immediately.
4. Press the (UP) arrow key to select a HARD reset.

5. “HARD RESET?” is displayed for confirmation. Press the (RIGHT) arrow key to select “YES” to carry out the reset, or the (LEFT) arrow key to select “NO” to cancel the reset operation.

6. After the Hard Reset has been performed “Reset Complete” will be displayed and the software will continue to start with all treatment data cleared. **Note: It will be necessary to re-enter all setup parameters back into the AutoSPRAY 4080.**

Appendix F Connector Pin-Outs

Spray Rate Controller Connector

Pin Number	Section Number
3	Boom 1
4	Boom 2
5	Boom 3
6	Boom 4
7	Boom 5
8	Boom 6
9	Boom 7
10	Boom 8
11	Master

GPS Serial Port Connector

Pin Number	Description
2	Receive Data
3	Transmit Data
4	Data Terminal Ready
5	Signal Ground
6	Data Set Ready
7	Request to Send
8	Clear to Send

Power Connector

Pin Number	Description
1	GND
2	IGNITION
4	12vDC

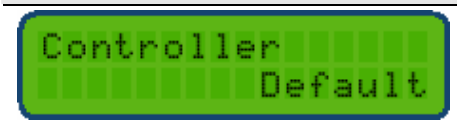
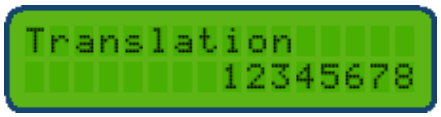
Appendix G Specifications

AutoSPRAY 4080

Weight	► 1450grams
Size	► 70 (w) x 280 (d) x 110 (h) mm
Display	► Two line text with backlighting
Environment	► Casing Aluminium extrusion, environmentally robust and shock resistant
	► Operational 0° to +45°C
	► Non-operational -20° to +60°C
Data I/O	► Electrical interface ASCII serial
	► Plug types DB-9 male USB AMP 16pin male AMP 4 pin male
Power	► 11 - 14vDC @ 15W with fused 5A blade type
Electrical	► Sections 8 Boom sections
	► Current 2 A per section 3.6A max
Cables	► Spray Controller In-line cable

Appendix H Setting up for Flexi-Coil SP655

The following describes steps for setting up and operating the AS4080 with a Flexi-Coil SP655 controller. Note: the standard SP655 controller must be upgraded by a technician prior to use with the AS4080.

Menu Item		Description
		In the PARAMETER menu set the CONTROLLER item to FLEXICOIL
		In the PARAMETER menu set the MASTER item to EXTERNAL
		In the WIDTH menu set the NO SECTIONS and the SECTION widths as per section 5.4
		In the SETUP menu, set the TRANSLATION values appropriately (Aux1=1,Aux2=2,Aux3=3,L=4,R=5) Ex: If using Left and Right = 45 If using Aux1-3 = 123
When operating the Flexi-Coil SP655, there are two modes of operation		
Section Control (DEFAULT)	☑	In this mode, the SP655 master switch is used as normal. The section switches will turn on and off automatically as required. However, there will be a delay of up to 0.3 sec when turning multiple switches OFF or ON.
Master Control This mode is entered by pushing the hidden button (above AUX3 button)		In this mode, the SP655 must be left in the OFF position. The AS4080 will now control both the individual sections and the master state. Hence when turning multiple sections off, the master will be turned off which increases the reaction time of the application

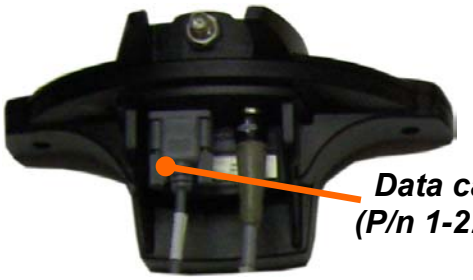
Appendix I Configuring the EZ-Guide®

The AutoSPRAY 4080 will connect directly to the EZ-Guide® using cable (p/n 1-2208) which must be ordered separately. The following steps details how to configure the EZ-Guide® and connect to the AutoSPRAY 4080. The following steps detail how to configure the EZ-Guide®, the steps can be confirmed directly from the EZ-Guide® user manual if necessary.

If the EZ-Guide® is connected to another device and the port is already used it will be necessary to use an additional splitter "Y" cable (P/n1-2295) which may also be ordered separately.

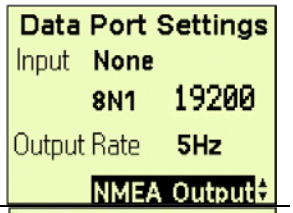
EZ-Guide®

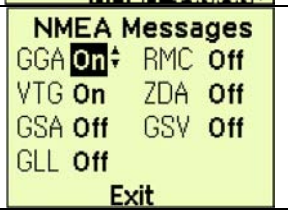
Front view



Rear view

Step	EZ-Guide® Instruction
1	Using the keys on the top of EZ-Guide® step to *Configuration Menu* (the bottom menu on the right side). Press OK to select the Lightbar menu.
2	Step to the *Data Port Settings* and change the ***Baud Rate*** to 19200 and ***Output Rate*** to 5Hz as shown.
3	Highlight *Exit*, and then press ▼ until *NMEA Output* is displayed. Press OK, set the NMEA messages to output ***GGA*** and **VTG** as shown.
4	Connect the EZ-Guide® to the AutoSPRAY 4080 controller and confirm that the controller is receiving GPS data in the GPS Status and GPS Health pages of the Display menu.





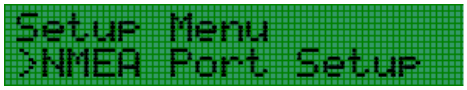
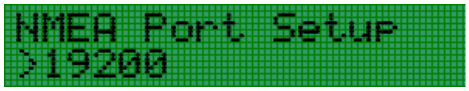
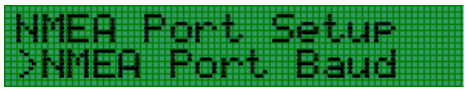
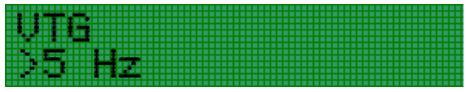
Appendix J Configuring the Outback®.

The AutoSPRAY 4080 will connect directly to the Outback® using standard cables. The following steps details how to configure the Outback® and connect to the AutoSPRAY 4080. The following steps detail how to configure the Outback®, the steps can be confirmed directly from the Outback® user manual if necessary.

If the Outback® is connected to another device and the port is already used it will be necessary to use a splitter "Y" cable (P/n1-2296) which may be ordered separately.

Outback®

Front view

Step	Outback® Instruction	
1	Go to the Setup Menu, then Press ⬇ until the NMEA Port Setup menu is displayed.	
2	Set the Baud rate to 19200, the press ENTER ↵	
3	Go to the Setup Menu, then Press ⬇ until the NMEA Port Baud menu is displayed.	
4	Set the GGA and VTG to On and to output at 5Hz using the ⬇ buttons.	
4	Connect the Outback® to the AutoSPRAY 4080 controller and confirm that the controller is receiving GPS data in the GPS Status and GPS Health pages of the Display menu.	

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